

(2) Operated by the programming control or combustion control sub-systems, as applicable.

(f) *Master fuel oil valves.* Each boiler must be provided with a master fuel oil valve to stop fuel to the boiler automatically upon actuation by the boiler safety trip control system.

(g) *Valve closure time.* The valves described in paragraphs (e) and (f) of this section must close within 4 seconds of automatic detection of unsafe trip conditions.

(h) *Burner safety trip control system.* (1) Each burner must be provided with at least one flame detector.

(2) The burner valve must automatically close when—

- (i) Loss of burner flame occurs;
- (ii) Actuated by the boiler safety trip control system;
- (iii) The burner is not properly seated or in place; or
- (iv) Trial for ignition fails, if a programming control is provided.

(i) *Boiler safety trip control system.* (1) Each boiler must be provided with a safety trip control system that automatically closes the master and all burner fuel oil valves upon—

- (i) Boiler low-low water level;
- (ii) Inadequate boiler air flow to support complete combustion;
- (iii) Loss of boiler control power;
- (iv) Manual safety trip operation; or
- (v) Loss of flame at all burners.

(2) The low-low water level safety trip control must account for normal vessel motions and operating transients.

[CGD 81–030, 53 FR 17838, May 18, 1988, as amended by USCG–2002–13058, 67 FR 61278, Sept. 30, 2002]

§ 62.35–35 Starting systems for internal-combustion engines.

The starting systems for propulsion engines and for prime movers of ships’

service generators required to start automatically must meet sections 4–6–5/9.5 and 4–8–2/11.11 of the ABS Steel Vessel Rules (incorporated by reference; see 46 CFR 62.05–1).

[USCG–2003–16630, 73 FR 65189, Oct. 31, 2008]

§ 62.35–40 Fuel systems.

(a) *Level alarms.* Where high or low fuel tank level alarms are required, they must be located to allow the operator adequate time to prevent an unsafe condition.

(b) *Coal fuels.* (1) Controls and instrumentation for coal systems require special consideration by the Commandant CG–521.

(2) Interlocks must be provided to ensure a safe transfer of machinery operation from one fuel to another.

(c) *Automatic fuel heating.* Automatic fuel heating must meet section 4–9–3/15.1 of the ABS Steel Vessel Rules (incorporated by reference; see 46 CFR 62.05–1).

(d) *Overflow prevention.* Fuel oil day tanks, settlers, and similar fuel oil service tanks that are filled automatically or by remote control must be provided with a high level alarm that annunciates in the machinery spaces and either an automatic safety trip control or an overflow arrangement.

[CGD 81–030, 53 FR 17838, May 18, 1988, as amended by CGD 95–072, 60 FR 50463, Sept. 29, 1995; CGD 96–041, 61 FR 50728, Sept. 27, 1996; USCG–2003–16630, 73 FR 65190, Oct. 31, 2008; USCG–2009–0702, 74 FR 49229, Sept. 25, 2009]

§ 62.35–50 Tabulated monitoring and safety control requirements for specific systems.

The minimum instrumentation, alarms, and safety controls required for specific types of systems are listed in Table 62.35–50.

TABLE 62.35–50—MINIMUM SYSTEM MONITORING AND SAFETY CONTROL REQUIREMENTS FOR SPECIFIC SYSTEMS (NOTE 1)

System	Service	Instrumentation	Alarm	Safety control	Notes
Main (Propulsion) boiler	(1) Supply casing and uptakes.	(1)	(1) Fire.	.....	(2)
	Burner flame	Status	Failure	Burner auto trip	(3)
	Burner seating .....	.....	Failure .....	.....ditto	(3)
	Trial for ignition	Status	Failure .....	.....ditto.	
	Control power	Available (pressure)	Failure (low) .....	.....ditto	(3)
	.....	.....	.....	Manual trip	(3)

TABLE 62.35–50—MINIMUM SYSTEM MONITORING AND SAFETY CONTROL REQUIREMENTS FOR SPECIFIC SYSTEMS (NOTE 1)—Continued

System	Service	Instrumentation	Alarm	Safety control	Notes
Main (Propulsion steam) turbine.	Burner valve	Open/closed.			
	Low fire interlock	Status.			
Main propulsion, diesel	Program control interlock.	Status.			
	(2)	(2)	(2)	Manual trip.	(4, 5)
Main propulsion, remote control.	(1)	(1)	(1)	Manual trip.	(4, 5)
	Auto safety trip override.		Activated.	.....ditto.	
Main propulsion, electric	Starting power	Pressure (voltage) ...	Low	Limit	(2)
	Location in control	Status	Override .....	.....	(6)
Main propulsion, shafting.	Shaft speed/direction/pitch.	(3)	(3)	(3).	
	Clutch fluid	Pressure	Low.	(4)	(7)
Main propulsion, controllable pitch propeller.	Stern tube oil tank level.		Low.		
	Line shaft bearing	Temperature	High.		
Generators	Hydraulic oil	Forced lubrication Pressure.	Low.		
	.....	Pressure	High, Low.		
Emergency Turbogenerator	Ship service	Temperature	High.		
	.....	(1)	(1).		
Auxiliary boiler	Starting pressure/voltage.		Low.		
	.....		Tripped.		
Gas turbine	Emergency	(5)	(5)	(5).	
	Turbogenerator	(1 6)	(1 6)	(6).	
Engines and turbines	Diesel	(1 7)	(1 7)	Manual trip.	(5)
	.....			Manual trip.	
Fuel oil	Run		Trip		(12)
	(8)	(8)	(8)	(8)	(5)
Machinery space CL3 W.T. doors.	Jacking/turning gear	Engaged			(8)
	(9)	(9)	(9).		
Fire detection	Remote/auto fill level		High	Auto trip or overflow arrangement.	
	Hi. press. leakage level.		High.		
Fire main	Pump remote control	Run.			
	Pump auto control	Run	Excessive operations.		
Personnel	Level		High/location.		
	Open/closed.				
General, control and alarm systems.	Machinery spaces		Space on fire		(9)
	Pressure		Low.		
Redundant auxiliary, system, power supply.	Deadman		Fail to acknowledge		(10)
	Power supply	Available (pressure)	Failure (low).		
	System function		Failure		(11)
	Console air conditioning.		Failure.		
	Built in test equipment.	Active.			
	Sequential interlock ..	Activated.			
	Safety control		Activated	Auto trip/limit	(11)
	.....	Status	Auto transfer.		

¹ See the ABS Steel Vessel Rules (incorporated by reference; see 46 CFR 62.05–1) Part 4–9–4, tables 7A and 8.

² See ABS Steel Vessel Rules Part 4–9–4, tables 7A and 8.

³ See § 113.37 of this chapter.

⁴ See subparts 111.33 and 111.35 of this chapter.

⁵ See subparts 112.45 and 112.50 of this chapter.

⁶ See § 111.12–1(c) of this chapter.

⁷ See § 111.12–1 (b), (c) of this chapter.

⁸ See ABS Steel Vessel Rules Part 4–9–4, Table 8; and 46 CFR 58.10–15(f).

⁹ See ABS Steel Vessel Rules Part 4-9-4, tables 7A and 8.

NOTES ON TABLE 62.35-50:

1. The monitoring and controls listed in this table are applicable if the system listed is provided or required.
2. Safety limit controls must be provided in navigating bridge primary propulsion control systems. See § 62.35-5(c).
3. Safety trip controls and alarms must be provided for all main boilers, regardless of mode of operation. See § 62.35-20(a).
4. Loss of forced lubrication safety trip controls must be provided, as applicable.
5. Override of overspeed and loss of forced lubrication pressure safety trip controls must not be provided. See § 62.35-5(e)(2).
6. Transfer interlocks must be provided.
7. Semiconductor controlled rectifiers must have current limit controls.
8. Interlocks must be provided. See § 62.25-5(a).
9. Main and remote control stations, including the navigational bridge, must provide visual and audible alarms in the event of a fire in the main machinery space.
10. See § 62.50-20(b)(1).
11. Alarms and controls must be failsafe. See § 62.30-1.
12. Vital auxiliary boilers only. Also see part 63.

[CGD 81-030, 53 FR 17838, May 18, 1988; 53 FR 19090, May 26, 1988, as amended by USCG-2000-7790, 65 FR 58461, Sept. 29, 2000; USCG-2003-16630, 73 FR 65190, Oct. 31, 2008]

Subpart 62.50—Automated Self-propelled Vessel Manning

§ 62.50-1 General.

(a) Where automated systems are provided to replace specific personnel in the control and observation of the engineering plant and spaces, or reduce overall crew requirements, the arrangements must make sure that under all sailing conditions, including maneuvering, the safety of the vessel is equal to that of the same vessel with the entire plant under fully attended direct manual supervision.

(b) Coast Guard acceptance of automated systems to replace specific personnel or to reduce overall crew requirements is predicated upon—

- (1) The capabilities of the automated systems;
- (2) The combination of the personnel, equipment, and systems necessary to ensure the safety of the vessel, per-

sonnel, and environment in all sailing conditions, including maneuvering;

(3) The ability of the crew to perform all operational evolutions, including emergencies such as fire or control or monitoring system failure;

(4) A planned maintenance program including routine maintenance, inspection, and testing to ensure the continued safe operation of the vessel; and

(5) The automated system's demonstrated reliability during an initial trial period, and its continuing reliability.

NOTE: The cognizant Officer in Charge, Marine Inspection, (OCMI) also determines the need for more or less equipment depending on the vessel characteristics, route, or trade.

(c) Equipment provided to replace specific personnel or to reduce overall crew requirements that proves unsafe or unreliable in the judgment of the cognizant Officer in Charge, Marine Inspection, must be immediately replaced or repaired or vessel manning will be modified to compensate for the equipment inadequacy.

§ 62.50-20 Additional requirements for minimally attended machinery plants.

NOTE: Minimally attended machinery plants include vessel machinery plants and spaces that are automated, but not to a degree where the plant could be left unattended. Emphasis is placed on the centralized remote control and monitoring of the machinery plant and machinery spaces.

(a) *General.* (1) Navigating bridge propulsion control must be provided.

(2) An ECC must be provided and must include the automatic and remote control and monitoring systems necessary to limit the operator's activity to monitoring the plant, initiating programed control system sequences, and taking appropriate action in an emergency.

(3) The ECC must include control and monitoring of all vital engineering systems, including—

- (i) The propulsion plant and its auxiliaries;
- (ii) Electrical power generation and distribution;